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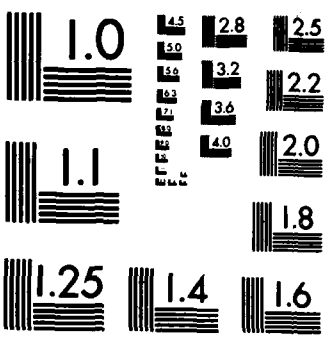

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FOREIGN TECHNOLOGY DIVISION

ORBITAL STATIONS - PLANS AND ACCOMPLISHMENTS

by

V. Golev

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Block	Italic	Transliteration	Block	Italic	Transliteration
А а	*А а*	A, a	Р р	*Р р*	R, r
Б б	*Б б*	B, b	С с	*С с*	S, s
В в	*В в*	V, v	Т т	*Т т*	T, t
Г г	*Г г*	G, g	У у	*У у*	U, u
Д д	*Д д*	D, d	Ф ф	*Ф ф*	F, f
Е е	*Е е*	Ye, ye; E, e*	Х х	*Х х*	Kh, kh
Ж ж	*Ж ж*	Zh, zh	Ц ц	*Ц ц*	Ts, ts
З з	*З з*	Z, z	Ч ч	*Ч ч*	Ch, ch
И и	*И и*	I, i	Ш ш	*Ш ш*	Sh, sh
Й й	*Й й*	Y, y	Щ щ	*Щ щ*	Shch, shch
К к	*К к*	K, k	Ъ ъ	*Ъ ъ*	"
Л л	*Л л*	L, l	Ы ы	*Ы ы*	Y, y
М м	*М м*	M, m	Ь ь	*Ь ь*	'
Н н	*Н н*	N, n	Э э	*Э э*	E, e
О о	*О о*	O, o	Ю ю	*Ю ю*	Yu, yu
П п	*П п*	P, p	Я я	*Я я*	Ya, ya

*ye initially, after vowels, and after ъ, ь; e elsewhere.
When written as ё in Russian, transliterate as yё or ё.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh^{-1}
cos	cos	ch	cosh	arc ch	cosh^{-1}
tg	tan	th	tanh	arc th	tanh^{-1}
ctg	cot	cth	coth	arc cth	coth^{-1}
sec	sec	sch	sech	arc sch	sech^{-1}
cosec	csc	csch	csch	arc csch	csch^{-1}

Russian	English
rot	curl
lg	log

GRAPHICS DISCLAIMER

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ORBITAL STATIONS—PLANS AND ACCOMPLISHMENTS

V. Golev

The extended space flight of the Salyut scientific orbital station constitutes an important step toward the development of permanent scientific observatories beyond the Earth's atmosphere. An extensive program of scientific-technical research and tests of new on-board systems, units and instruments continued for approximately half a year—176 days. A great number of experiments were conducted as well, experiments which have advanced the study of space as well as of the Earth itself.

What further developments might we now see in one of the key directions in astronautics—the development of permanent orbital research centers?

The present-day level of industrial, scientific and technical development; advances in astronautics and the enormous practical experience accumulated in the process of launching different types of automatic satellites and manned spacecraft have made the development of permanent manned orbital stations a realistic proposition.

None of this, of course, excludes the possibility of solo or group flights of Soyuz-type vehicles. Space flights such as these will begin to see scientists and designers solving concrete scientific and technical problems; develop components, systems and instruments for new spacecraft and undertake an extensive program of work on scientific and applied problems.

Complex large-scale experiments requiring prolonged stays in space can be conducted more efficiently with the use of permanent

stations equipped with a variety of apparatus and the proper scientific instrumentation.

Any orbital space station will be a complex designed to achieve a variety of objectives. In the initial stages it might be a small space observatory built on Earth and then launched with a single vehicle. Later we might see multiton stations assembled in orbit, building them individual components.inserted into orbit one after another. In time this will make it possible to replace individual components along with the apparatus they contain, thus partially or entirely altering the functional orientation and specialization of the space station involved.

We know of a variety of plans for permanent observatories which will carry crews of two and three people or more. They might remain in operation for periods ranging from a few weeks to a year or several years. In developing the first stations it will of course be to advantage to make maximum use of components, assemblies and systems available on existing spacecraft and associated equipment so as to reduce their cost to a minimum and to obtain test data for the development of large space observatories.

A number of stations can be designed such that a large base station can later be assembled from two or more such "blocks." These stations will have a variety of compartments: a living compartment; an operating compartment from which the station will be controlled; a laboratory compartment equipped with apparatus and instruments for conducting scientific research; a cargo bay and a number of others, as well as special mooring points for transport vehicles. It will be important to provide for the possibility of reequipping individual areas of the station so as to be able quickly to "retool" a laboratory compartment for biological research after completing some physics experiments, for example.

What with the fact that orbital stations, not to mention bases, will require great amounts of electric power, the bay housing their electric power plant will of course be among the most critical components. While solar cells are being employed as primary power sources for the early stations, the later station bases will be supported by nuclear power plants.

A number of mooring points on the station will make it possible to receive several cargo craft simultaneously. In the course of

performing their missions in space, space craft may separate and undertake independent flights in manned or automatic modes. The scientific experiments conducted on such missions will substantially complement and extend the capabilities of the base stations.

Large stations equipped for undertaking complex and extensive programs of research and experimentation will have to have scientists, engineers and other categories of specialists on board. The operation of these permanent facilities in space makes the reuse of transport vehicles an timely and urgent problem. The problem of reuse of the rocket boosters employed to insert them into orbit can also see solution in the future.

These are some of the prospects for development of near-Earth stations whose mission will be to study and exploit space in the interests of both science and the national economy.